SSOs: Locking Up Repeat Offenders

Travis Andrews
Assistant Water Director/Field Operations
Fort Worth Water Department
SSOs: Locking Up Repeat Offenders

- Introduction
- Clear/Inspect/Fix (CIF) Process
- Fixing Root Causes
- CIF Results
Fort Worth Water Department
Field Operations Division

Frank Crumb
Water Director
1AP

Sebastian Fichera
Assistant Director
Water Reclamation
130 AP
- Wastewater Treatment
  - Bio-solids
  - Energy
  - Reuse water
- Pretreatment services
- Backflow and cross connection

Charly Angadicheril
Assistant Director
Production
122 AP
- North & South Holly WTPs
- Rolling Hills WTP
- Eagle Mountain WTP
- Westside WTP
- Distribution stations
- Wholesale metering
- Sewer lift stations

Andy Cronberg
Assistant Director
Engineering & Regulatory Services
102 AP
- Capital Improvement Program
- Engineering
- New/Rehab Development Services
- Regulatory Services
- Laboratory Services
- Lake Worth
- Safety/security

Kara Shuror
Assistant Director
Business Services
218 AP
- Administration
- Retail/Wholesale Customer Relations & Billing
- Public education
- IT services
- Water conservation
- Meter services
- Water development
- Finance

Travis Andrews
Assistant Director
Field Operations
367 AP
- Water mains, valves, fire hydrants, & services
- Sewer mains, services, & manholes
- Field services
- Technical services
- Warehouse
- Street repair
General Information

- O&M of Water Distribution, Wastewater Collection, & Reclaimed Water Distribution Systems
- $34.9M Budget, 365 Employees
- 350 Sq. Mi. Service Area; 24/7/365 Operation
- One Facility Site: 1608 11th Ave
- 22 Wholesale Customer Cities (e.g. Saginaw, Haltom City, Burleson)
- 1 Million Customers
Field Operations Program Management

- Track >120 Performance Measures
- Customer Service Goals
- Maximo Work Management, Mobile Deployment
- AVL (Automated Vehicle Location)
- GIS (Geographic Information System)
- Other business support and reporting systems
Field Operations Organization

- **Water** - 115 Employees: (Mains, Valves & FH, Taps & Services; Conservation)
- **Wastewater** - 145 Employees: (Mains, Taps & Services, PM, Sewer Stops)
- **Support** - 94 Employees: (Utility Cuts, Locates, Water Quality, Warehouse, Dispatch, Earthfill, Administrative Services, Training)
- **Technical Services** - 7 Employees: (Sewer PM contract management, CCTV analysis and PM planning, Technology support)
Wastewater Collection System

- 3,560 sewer line miles
- 9 major basins
- 167 sub-basins
- 4” - 96” diameter pipe
- 52,731 maintenance holes, junction chambers, and offset MHs
- 29,000 work orders/yr
Sewer Group

- **Sewer Mains**
  Repair leaks and breaks on sewer mains;
  Repair, replace and/or adjust existing sewer mains

- **Taps & Services**
  Repair, replace and/or adjust existing services; install new taps and services

- **Stops & Emergencies**
  Respond to customer concerns regarding sewer system back-ups or overflows
Sewer Group PM

• Preventive Maintenance
  ➢ Sewer TV
    Inspect sewer mains with closed circuit television system and assist other sewer sections
  ➢ Sewer Cleaning
    Clean sewer lines of entire collection system on a pre-defined cycle
<table>
<thead>
<tr>
<th>Sewer Section:</th>
<th>Mains</th>
<th>Taps and Services</th>
<th>Stops</th>
<th>PM-Cleaning</th>
<th>PM- CCTV</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Annual Budget – Labor Salaries &amp; Benefits</td>
<td>$1.8</td>
<td>$1.8</td>
<td>$2.9</td>
<td>$1.0</td>
<td>$1.0</td>
<td>$8.5M</td>
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<td>$0.7</td>
<td>$0.8</td>
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<td>$0.3</td>
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<td>Number of Personnel</td>
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<td>27</td>
<td>48</td>
<td>20</td>
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<td>145</td>
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<td>Number of Work Orders (FY13)</td>
<td>1,117</td>
<td>1,596</td>
<td>13,355</td>
<td>7,052</td>
<td>5,869</td>
<td>28,989</td>
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<tr>
<td>Sewer Section:</td>
<td>Mains</td>
<td>Taps and Services</td>
<td>Stops</td>
<td>PM-Cleaning</td>
<td>PM- CCTV</td>
<td>Total</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------</td>
<td>------------------</td>
<td>-------</td>
<td>-------------</td>
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<tr>
<td>Dump Truck</td>
<td>9</td>
<td>6</td>
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<td>CCTV Van - Equip</td>
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<td>9</td>
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<td>Vactor - Combination Truck</td>
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<td>2</td>
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<tr>
<td>Jet-Eye - Clean &amp; CCTV combo</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Pick-ups</td>
<td>7</td>
<td>2</td>
<td>14</td>
<td>4</td>
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<td>Crew Truck</td>
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<td>6</td>
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<td>Mini-hoe</td>
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<td>3</td>
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<td>Trailers</td>
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<td>Rod Truck</td>
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<td>3</td>
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<td>Flushers</td>
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<td>0</td>
<td>4</td>
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<td>Easement Maintenance Machine</td>
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<td>0</td>
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<td>Gators - ATV</td>
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<td>0</td>
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<td>1</td>
<td>0</td>
<td>2</td>
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<tr>
<td>Easement Machine</td>
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<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
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<tr>
<td>Total Number of Vehicles</td>
<td>44</td>
<td>33</td>
<td>24</td>
<td>18</td>
<td>10</td>
<td>129</td>
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# Technical Services Group

<table>
<thead>
<tr>
<th>Group:</th>
<th>Technical Services</th>
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<tbody>
<tr>
<td>Annual Budget – Labor Salaries &amp; Benefits</td>
<td>$0.3M</td>
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<td>Annual Budget – Supplies</td>
<td>$0.05M</td>
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<td>ICAP Program</td>
<td>$0.4M</td>
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<tr>
<td>Annual Budget - Total</td>
<td>$0.8M</td>
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<tr>
<td>Number of Personnel</td>
<td>4</td>
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</table>

- ICAP, CCTV analysis & PM planning, & Maximo WMMS support
- Total Sewer: $12.5M budget, 149 employees
PM & ICAP Programs: Robust Sewer Assessment and PM Planning

- 3D Laser provides a high definition profile of the interior pipe wall above the water surface
- Sonar provides a high definition profile of the interior pipe wall below water surface
- HD TV provides HD video of the interior of the pipe
CLOSED CURCUIT TELEVISION (CCTV) INSPECTION
ICAP, CCTV, Work Orders (Maximo), GIS
- Targeted Inspection, Maintenance, and Repairs
- Targeted System Improvements
Clear/Inspect/Fix (CIF) Process

- Built upon strong wastewater Master Plan, Renewal, CCTV/PM, and Pre-treatment/FOG programs
- CIF entails following the clearing of line overflows and blockages with CCTV investigation, to identify and address (fix) the root causes
Clear/Inspect/Fix (CIF) Process

- Implemented CCTV inspection in 2010, mainly for repeat SSO lines
- Found that assumed SSO/stop causes were often incorrect
- In 2013, expanded to include blockages without overflows
- In 2013, SSOs per 100 miles of collection pipe fell below 10 for the first time
Clear/Inspect/Fix (CIF) Process

- Clearing and Maintaining Access
- Clearing Blockages (Stops)
- CCTV Inspection
- Fixing Root Causes
Clearing & Maintaining Access

- Maintain easements
  - Clear brush, build/maintain roads for hard to access locations
  - Easement machines, ATV Gators
- Walk out major interceptors and aerial crossings after storms
- SmartCovers to monitor problematic maintenance holes
Clearing Stops

- Rod/Flush/Jetter Trucks
- Bypass pumping if initially unsuccessful
CCTV Inspection

- Televise Immediately After Overflow Or Stop Is Controlled
- Determine Cause
CCTV Inspection

Roots (3 = 20% to 30% of pipe diameter)

M00016-042+02  USMH: 042+02  DSMH: 035+70

10/24/2013 9:55:24 AM  90.6 ft.
## CCTV Inspection

### Structural Ranking based on defects

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
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<tbody>
<tr>
<td>5</td>
<td>Structural failure has occurred and/or line has collapsed. Pipe has deteriorated beyond the ability to make intermediate repairs. Replace/rehabilitate immediately.</td>
</tr>
<tr>
<td>4</td>
<td>Structural failure identified failure imminent and/or partial collapse exist. Spot repairs difficult due to condition/deterioration/age. However pipe could possibly be maintained for 12 to 24 months +/-</td>
</tr>
<tr>
<td>3</td>
<td>Pipe is in poor condition. Major structural defects observed. Estimated time before failure 2-6 years +/-</td>
</tr>
<tr>
<td>2</td>
<td>Pipe is in fair condition with minor to moderate structural defects documented. Estimated time before failure 6 - 10 years +/-</td>
</tr>
<tr>
<td>1</td>
<td>Pipe in good/excellent condition. Estimated time before failure greater than 10 years.</td>
</tr>
</tbody>
</table>
Fixing Root Causes

- Repair
- Renewal
- PM
  - CCTV/Cleaning
  - Root Eradication
- FOG Program Activities
Fixing Root Causes

<table>
<thead>
<tr>
<th>Main Cause of Overflow</th>
<th>FY09</th>
<th>FY10</th>
<th>FY11</th>
<th>FY12</th>
<th>FY13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overflow due to debris build-up in line</td>
<td>185</td>
<td>198</td>
<td>243</td>
<td>127</td>
<td>148</td>
</tr>
<tr>
<td>Overflow due to grease build-up in line</td>
<td>219</td>
<td>189</td>
<td>161</td>
<td>119</td>
<td>158</td>
</tr>
<tr>
<td>Overflow due to heavy rain</td>
<td>11</td>
<td>65</td>
<td>2</td>
<td>67</td>
<td>0</td>
</tr>
<tr>
<td>Overflow due to roots in line</td>
<td>38</td>
<td>37</td>
<td>34</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Overflow due to structural failure</td>
<td>17</td>
<td>19</td>
<td>13</td>
<td>16</td>
<td>9</td>
</tr>
</tbody>
</table>
## Fixing Root Causes

<table>
<thead>
<tr>
<th>PM Section</th>
<th>FY09</th>
<th>FY10</th>
<th>FY11</th>
<th>FY12</th>
<th>FY13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sewer Cleaning (LF)</td>
<td>1,128,851</td>
<td>1,581,539</td>
<td>1,722,969</td>
<td>1,415,580</td>
<td>1,727,816</td>
</tr>
<tr>
<td>Sewer CCTV inspections (LF)</td>
<td>1,217,724</td>
<td>1,559,629</td>
<td>1,703,394</td>
<td>1,522,724</td>
<td>1,580,236</td>
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</tbody>
</table>
Clear/Inspect/Fix (CIF) Results

- Built upon strong wastewater Master Plan, Renewal, CCTV/PM, and Pre-treatment/FOG programs
- Reduction in SSOs and Stops
- Reduced emergency response cost
- Better protection of environment & public health
## Clear/Inspect/Fix (CIF) Results

<table>
<thead>
<tr>
<th></th>
<th>FY09</th>
<th>FY10</th>
<th>FY11</th>
<th>FY12</th>
<th>FY13</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stops (actual blockages w/o overflows)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>301</td>
<td>323</td>
<td>229</td>
<td>275</td>
<td>196</td>
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<tr>
<td><strong>SSOs</strong></td>
<td>474</td>
<td>556</td>
<td>459</td>
<td>355</td>
<td>277</td>
</tr>
</tbody>
</table>
Fort Worth Sanitary Sewer Overflows per 100 Miles of Collection System Piping

Rainfall Source: www.srh.noaa.gov (Dallas-Fort Worth Metro Area)

30 YEAR ANNUAL RAINFALL AVERAGE = 35" +/-